**Handful of Cubes**

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| In this lesson, students explore strategies for counting handfuls of cubes to develop the concept of place value. |

**NC Mathematics Standard(s):**

**Understand place value.**

**NC.1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones.

• Unitize by making a ten from a collection of ten ones.

• Model the numbers from 11 to 19 as composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

• Demonstrate that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or

nine tens, with 0 ones.

**Additional/Supporting Standard(s):**

**Extend and recognize patterns in the counting sequence.**

**NC.1.NBT.1** Count to 150, starting at any number less than 150.

**NC.1.NBT.7** Read and write numerals, and represent a number of objects with a written numeral, to 100.

**Use place value understanding and properties of operations.**

**NC.1.NBT.5** Given a two-digit number, mentally find 10 more or 10 less than the number without having to count; explain the reasoning used.

**Standards for Mathematical Practice:**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Model with mathematics.
4. Use appropriate tools strategically.
5. Attend to precision.

**Student Outcomes:**

* I can understand that the two digits in a two-digit number represent the number of ones and tens.
* I can unitize a collection of 10 objects.
* I can count (up to 150) starting at any number less than 150.
* I can represent a numeral with objects in groups of tens and ones.

**Materials:**

* Copies of multiple ten frames work mats, 1 for each student (blackline master attached)
* Baskets of snap cubes, (between 30-50 cubes per basket), 1 basket for each pair of students
* Recording sheet, 1 per student (These can be laminated or placed in sleeve protectors and used as wipe off sheets), markers

**Advance Preparation**:

* Review the significant ideas in Critical Area 2 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of whole number relationship and place value, including grouping in tens and ones.
* Prepare baskets of cubes
* Prepare copies of multiple ten frames work mats
* Prepare recording sheets as wipe off cards, 1 per pair of students
* Determine partner pairings and create an assignment list

**Directions:**

1. Gather students on the floor.
2. Tell students, “Today at your tables you will find baskets of cubes. Your task is for you and your partner to take turns grabbing a handful of the cubes and determining how many cubes you grabbed. Tell your partner how many cubes you have. Next, group your collection of cubes into groups of tens and ones. Tell your partner what you find out. You have tools you may use if you wish. Record the number of cubes and the number of groups of tens and ones you have on the wipe off recording sheet. Then play again for several rounds.
3. Assign partners and send students to the tables to work.
4. As students work, circulate and make notes about how students solve the task.

* Does the student count the cubes one by one? If so, notice how they group them for counting.
* Does the student organize the cubes for the count in some kind of order (in a linear arrangement or random)?
* Do they organize in groups of tens using ten frames?
* Do students snap cubes together into groups of tens (unitize)?
* Can students correctly record the number of objects on the recording sheet, recognizing the number of tens and the number of ones in their collections? Do they understand the value of each digit in the number?

1. Ask questions to assess understanding and any misconceptions students may have. (See suggested questions below).
2. After most students complete the task, bring the group back together.
3. Based on your observations, call students to share their strategies. (Remember to call on students with correct but simple solution strategies to share first before calling on students who demonstrated understanding of grouping (unitizing) tens, and the value of the digits.

An explanation might be,

“I have 12 cubes. I know I have 12 because I filled one ten frame and I have 2 more on this frame. I grouped ten cubes into one ten and then I counted 10, 11, 12.”

(As the teacher circulates during student partner time, this part of the task provides

information for the teacher about students’ counting understanding. Can the student count on from 10 or 20, when 1 or 2 ten frames have been filled, or does the student have to go back and count all beginning at one?)

1. Allow students to continue this task on other occasions and with larger amounts of cubes in the baskets.

**Questions to Pose:**

While students are in whole group:

* What do you know about this task?
* Tell me in your own words.
* What are some ways you can show your mathematical thinking when you work on this task?
* What do you know about working with two digit numbers?

As they work on the problem:

* Tell me about your thinking.
* What does this part of your number show? How did you know that?
* What tool did you decide to use to help you solve your problem? Why did you select it?
* Which numeral shows the number of tens in your number? How do you know?
* What would happen if I grabbed 6 more cubes and put them with your 18? How many tens would you have? How many ones? Show me how you know.
* I notice you did not have to count all your cubes. Explain to me how you determined how many you have?
* How can you solve this problem another way?

After solving (whole group):

* Who can restate what we were asked to do with this task?
* Tell the group how you solved it. What did you do first? Why? What did you do next? Why?
* What was your mathematical thinking for this problem?
* Show the group your recording sheet. What does each of the digits represent?
* How can you solve this problem another way?

**Possible Misconceptions/Suggestions:**

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| **Possible Misconceptions** | **Suggestions** |
| Student cannot identify the value of the numbers in the tens place. | Have the student use cubes to compose and decompose smaller numbers (10,11,12) to compare the numbers.  Have the student use number lines to compare the relationships between the numbers such as 1 and 10. |

**Special Notes:**

To extend this task, after students have had many experiences with the task, present this task again, asking partners to add their two handfuls. Note how students determine how to join their sets of cubes by unitizing or by placing cubes on the multiple ten frame mats, or counting all by ones. Materials could also be varied. Links, straws, crayons, paper clips, etc. could be bundled with rubber bands, small cups, or plastic baggies.

**Ten Frame Work Mats**

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**Handful of Cubes Recording Sheet**

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| I grabbed | I can make | I have | If I get  more cubes, |
|  |  |  | I can make |
| cubes. | groups of ten. | ones. | tens. |
| I grabbed | I can make | I have | If I get  more cubes, |
|  |  |  | I can make |
| cubes. | groups of ten. | ones. | tens. |
| I grabbed | I can make | I have | If I get  more cubes, |
|  |  |  | I can make |
| cubes. | groups of ten. | ones. | tens. |
| I grabbed | I can make | I have | If I get |
|  |  |  | more cubes, |
| cubes. | groups of ten. | ones. | I can make  tens. |